

CLAIMS

What is claimed is:

1. A method for configuring a gas distribution channel, said gas distribution channel being configured for introducing a plasma source gas into a plasma processing chamber of a plasma processing system, comprising:

providing a metal conduit;

providing a thermo-plastic tubular structure;

disposing said thermo-plastic tubular structure within said metal conduit; and

applying heat and pressure to said thermo-plastic tubular structure, thereby causing said thermo-plastic tubular structure to mechanically couple with said metal conduit wherein an outer surface of said thermo-plastic tubular structure is longitudinally coupled with an inner surface of said metal conduit.

2. The method of claim 1 further comprising configuring said gas distribution channel to enable a flow of said plasma processing source gas through said channel to be controlled by a mass flow controller of said plasma processing system.

3. The method of claim 1, wherein said step of providing a thermo-plastic tubular structure further includes coupling a resin material to said outer surface.

4. The method of claim 3, where said resin material is applied to said outer surface by molding injection.

5. The method of claim 1, where said metal conduit is stainless steel.

6. The method of claim 1, where said metal conduit is copper.

7. The method of claim 1, where said metal conduit is aluminum.

8. The method of claim 1, where said metal conduit is a metal alloy.

9. The method of claim 1, where said thermo-plastic tubular structure is PTFE.

10. The method of claim 1, where said thermo-plastic tubular structure is FEP.

11. The method of claim 1, where said thermo-plastic tubular structure is PFA.
12. The method of claim 1, where said thermo-plastic tubular structure is PCTFE.
13. The method of claim 1, where said thermo-plastic tubular structure is CTFE.
14. The method of claim 3, where said resin material is PTFE.
15. The method of claim 3, where said resin material is FEP.
16. The method of claim 3, where said resin material is PFA.
17. The method of claim 3, where said resin material is PCTFE.
18. The method of claim 3, where said resin material is CTFE.
19. A method for configuring a gas distribution channel, said gas distribution channel being configured for introducing a plasma source gas into a plasma processing chamber of a plasma processing system, comprising:
 - providing a metal conduit;
 - providing a resin;
 - disposing said resin within said metal conduit by molding injection, wherein said resin is longitudinally coupled with said inner surface of said metal conduit.
20. The method of claim 19 further comprising configuring said gas distribution channel to enable a mass flow controller to control a flow of said plasma processing source gas through said channel to said plasma processing system.
21. The method of claim 19, where said metal conduit is stainless steel.
22. The method of claim 19, where said metal conduit is copper.
23. The method of claim 19, where said metal conduit is aluminum.
24. The method of claim 19, where said metal conduit is a metal alloy.
25. The method of claim 19, where said resin material is PTFE.

26. The method of claim 19, where said resin material is FEP.
27. The method of claim 19, where said resin material is PFA.
28. The method of claim 19, where said resin material is PCTFE.
29. The method of claim 19, where said resin material is CTFE.
30. A gas distribution system for distributing plasma processing gases in a plasma processing chamber of a plasma processing, comprising:
 - a set of channels, each of said channels comprising a thermoplastic tubular structure and a metal conduit, an outer surface of said thermoplastic tubular structure being longitudinally coupled with an inner surface of said metal conduit; and
 - a mass flow controller coupled to control a flow of one of said plasma processing gases through said one of said channels.
31. The gas distribution system of claim 30, wherein said thermoplastic tubular structure is longitudinally coupled to said metal conduit by applying heat and pressure.
32. The gas distribution system of claim 30, wherein said thermo-plastic tubular structure further includes a resin material coupled to said outer surface.
33. The gas distribution system of claim 32, where said resin material is applied to said outer surface by molding injection.
34. The gas distribution system of claim 32, where said resin material is applied to said outer surface by blow molding.
35. The gas distribution system of claim 30, where said metal conduit is stainless steel.
36. The gas distribution system of claim 30, where said metal conduit is copper.
37. The gas distribution system of claim 30, where said metal conduit is aluminum.
38. The gas distribution system of claim 30, where said metal conduit is a metal alloy.

39. The gas distribution system of claim 30, where said thermo-plastic tubular structure is PTFE.
40. The gas distribution system of claim 30, where said thermo-plastic tubular structure is FEP.
41. The gas distribution system of claim 30, where said thermo-plastic tubular structure is PFA.
42. The gas distribution system of claim 30, where said thermo-plastic tubular structure is PCTFE.
43. The gas distribution system of claim 30, where said thermo-plastic tubular structure is CTFE.
44. The gas distribution system of claim 30, where said resin material is PTFE.
45. The gas distribution system of claim 32, where said resin material is FEP.
46. The gas distribution system of claim 32, where said resin material is PFA.
47. The gas distribution system of claim 32, where said resin material is PCTFE.
48. The gas distribution system of claim 32, where said resin material is CTFE.